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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/718,126

11/19/2003

Mehrdad Nikoonahad

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EXAMINER

PHAM, HOA Q

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 08/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/718,126

Applicant(s)

NIKOONAHAD ET AL.

Examiner

Hoa Q. Pham

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2877

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-127 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-127 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 November 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 7/12/04; 11/12/04;
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Petition***

1. The petition to apply for patent under 37 C.F.R. 1.47 (a) has been granted.

### ***Drawings***

2. The drawings are objected to because figures 1-15 are in handwriting. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Claim Rejections - 35 USC § 103***

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3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-27, 39-78, 90-110, 120-127 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwon (6,519,045) in view of Johs et al (6,859,278).

Regarding claims 1, 40-50, 53, 90-100, 121-122, and 125-126, Kwon discloses a method and apparatus for determining the actual thickness of thin dielectric film on a wafer (10) comprises a light source for illuminating a beam of light along an illumination path, a detector (12) for detecting reflected light from the surface of the wafer for determining the characteristics of the wafer, whereby the apparatus includes a source of inert gas (i.e., nitrogen) tubing to bring the gas to the wafer (column 3, lines 44-62 and column 4, lines 12-22 and figure 4). Kwon also teaches that the spectral reflectometers may cover the visible, ultraviolet, and infrared wavelength ranges could be used (column 4, lines 58-65) and does not explicitly teach the use of vacuum ultraviolet (VUV); however, such a feature is known in the art as taught by Johs et al. Johs et al, from the same field of endeavor, discloses a reflectometer system in which different kinds of wavelength ranges are used (i.e., VUV, UV, Visible, Infrared, etc..) (column 4, lines 47-55). It would have been obvious to one having ordinary skill in the art at the time the invention was made to replace the light source of Kwon by a VUV light source taught by Johs et al because they are function in the same manner. A substitution one for another is generally recognized as being within the level of ordinary skill in the art.

Regarding claims 2-3, 54-55, see abstract of Kwon for a thickness metrology apparatus.

Regarding claims 4 and 56, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the basic device of Kwon for detecting different characteristics of the wafer such as critical dimension, wall angle, pitch, etc., if additional measurements are desired.

Regarding claims 5-8, 57-60, see polarizer, compensator and analyzer in figure 4 of Kwon.

Regarding claim 9, it is inherent that the signal from polarizer is perpendicular to the signal from the analyzer.

Regarding claims 10-21, 61-72, see column 4, line 62 of Kwon for the use of an ellipsometer.

Regarding claims 22-23, 26, 73-74, 76-78, see column 4, lines 64-65 of Kwon for the use of visible, ultraviolet or infrared wavelength ranges.

Regarding claims 24 and 75, see figure 4 of Kwon for the focusing beam on the surface of the wafer.

Regarding claims 39, 90 and 110, see figure 4 of Kwon for the oblique illumination.

Regarding claims 51-52, 120, it would have been obvious to leave the wafer of Kwon outside the vacuum chamber so that the wafer is transferred easily without breaking the vacuum, thus increase the accuracy of the measurement.

Regarding claims 101-109, it would have been matter of design choice to choose the dimensions, shape, size of the hole so that it suitable to the designed device.

Regarding claims 123-124 and 127, it would have been obvious to one having ordinary skill in the art at the time the invention was made to include in Kwon an shielding means between the sample and the envelope. The rationale for this modification would have arisen from the fact that by adding such shielding means would prevent the ambient light or unwanted light that may enter the detection system, thus increase the signal to noise ratio.

5. Claims 28-38, 79-89, 111-119 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kwon and Johs et al as applied to claims 1-27, 39-78, 90-110,120-127 above, and further in view of Clementi et al (5,712,701).


Clementi et al teaches a known bright-field illumination system and dark-field illumination (see figures 1, 3 and 6). Thus, it would have been obvious to one having ordinary skill in the art to arrange the optical inspection system of Kwon in bright-field or dark-field mode as taught by Clementi for the purpose of detecting defects on the surface of the wafer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoa Q. Pham whose telephone number is (571) 272-2426. The examiner can normally be reached on 7:30AM to 6 PM, Monday through Thursday.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr. can be reached on (571) 272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Hoa Q. Pham  
Primary Examiner  
Art Unit 2877

HP  
August 19, 2006